

The claims defining the invention are as follows:

1. A method of quantifying the extent of erythema around a wound of a patient, the method comprising the steps of:
 - 5 capturing an image that includes the wound, the erythema and surrounding skin;
defining a border of the wound;
performing a distance transform on an area of the image between the wound border and a boundary of the image to determine bands of pixels, wherein the pixels within each said band are equidistant from the wound border;
 - 10 calculating a representative value for each said band;
defining a threshold level relative to the representative value of the surrounding skin;
identifying an erythema boundary as the band having a representative value closest to the threshold level; and
 - 15 calculating a characteristic value to quantify the region within the erythema boundary.
2. A method according to claim 1 wherein the characteristic value is selected from the group consisting of:
 - 20 a radius of the erythema boundary;
a diameter of the erythema boundary; and
an area of the region within the erythema boundary.
3. A method according to claim 1 wherein the representative value is selected from
25 the group consisting of:

an average brightness; and

an average color.

4. A method according to claim 1, further comprising the step of applying a clear
5 fluid to the patient before the image capture step to reduce specular reflections from the
patient.
5. A method according to claim 4 wherein the clear fluid is a gel.
- 10 6. A method according to claim 1, wherein cross-polarised light is used in the
image capture step to reduce specular reflections from the patient.
7. A method according to claim 1, further comprising the step of enhancing the
image to increase contrast.
- 15 8. A method according to claim 7 wherein the image is defined with respect to an
intensity component and said enhancement step comprises replacing the intensity
component with a principal component value.
- 20 9. A method of monitoring a wound of a patient, the method comprising the steps
of:
capturing a time series of images, each said image including the wound,
erythema around the wound and clear skin surrounding the erythema;
for each said image, defining a border of the wound;

for each said image, performing a distance transform on an area of the image between the wound border and a boundary of the image to determine bands of pixels, wherein the pixels within each said band are equidistant from the wound border;

for each image, calculating a representative value for each said band;

5 defining a threshold level relative to the representative value of the surrounding clear skin;

for each image, identifying an erythema boundary as the band having a representative value closest to the threshold level;

10 for each image, calculating a characteristic value to quantify the region within the erythema boundary; and

comparing said characteristic values to monitor changes in the extent of erythema around the wound.

10. A method according to claim 9 wherein the characteristic value is selected from
15 the group consisting of:

a radius of the erythema boundary;

a diameter of the erythema boundary; and

an area of the region within the erythema boundary.

20 11. A method according to claim 9 wherein the representative value is selected from the group consisting of:

an average brightness; and

an average color.

12. Apparatus for quantifying the extent of erythema in an image including a wound, erythema around the wound and clear skin surrounding the erythema, the apparatus comprising:

means for defining a border of the wound;

5 means for performing a distance transform on an area of the image between the wound border and a boundary of the image to determine bands of pixels, wherein the pixels within each said band are equidistant from the wound border;

means for calculating a representative value for each said band;

means for identifying an erythema boundary as the band having a representative
10 value closest to a threshold level; and

means for calculating a characteristic value to quantify the region within the erythema boundary.

13. Apparatus according to claim 12 wherein the characteristic value is selected from
15 the group consisting of:

a radius of the erythema boundary;

a diameter of the erythema boundary; and

an area of the region within the erythema boundary.

20 14. Apparatus according to claim 12 wherein the representative value is selected from the group consisting of:

an average brightness; and

an average color.

15. Apparatus according to claim 12, further comprising means for enhancing the image to increase contrast.

16. Apparatus according to claim 15 wherein the image is defined with respect to an intensity component and said means for enhancing the image acts to replace the intensity component with a principal component value.

17. A computer program comprising machine-readable program code for controlling the operation of a data processing apparatus on which the program code executes to perform a method for quantifying the extent of erythema in an image including a wound, erythema around the wound and clear skin surrounding the erythema, the computer program comprising:

code for defining a border of the wound;

code for performing a distance transform on an area of the image between the wound border and a boundary of the image to determine bands of pixels, wherein the pixels within each said band are equidistant from the wound border;

code for calculating a representative value for each said band;

code for identifying an erythema boundary as the band having a representative value closest to a threshold level; and

code for calculating a characteristic value to quantify the region within the erythema boundary.

18. A computer program product comprising machine-readable program code recorded on a machine-readable recording medium, for controlling the operation of a data processing apparatus on which the program code executes to perform a procedure to

quantify the extent of erythema in an image including a wound, erythema around the wound and clear skin surrounding the erythema, the procedure comprising the steps of:

defining a border of the wound;

performing a distance transform on an area of the image between the wound

5 border and a boundary of the image to determine bands of pixels, wherein the pixels within each said band are equidistant from the wound border;

calculating a representative value for each said band;

identifying an erythema boundary as the band having a representative value closest to a threshold level; and

10 calculating a characteristic value to quantify the region within the erythema boundary.

19. An apparatus for quantifying the extent of erythema around a wound of a patient, the apparatus comprising:

15 a storage device for storing an image that includes the wound, the erythema and surrounding skin; and

a processor coupled to the storage device and programmed to:

define a border of the wound;

perform a distance transform on an area of the image between the
20 wound border and a boundary of the image to determine bands of pixels, wherein the pixels within each said band are equidistant from the wound border;

calculate a representative value for each said band;

define a threshold level relative to the representative value of the surrounding skin;

identify an erythema boundary as the band having a representative value closest to the threshold level; and

calculate a characteristic value to quantify the region within the erythema boundary.